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Littering and Vandalism on the Highway System

A Preliminary Examination of the Problems

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EXECUTIVE SUMMARY

INTRODUCTION

A need to research littering and vandalism on Ontario highways was identified by Hamilton District. Senior highway maintenance personnel of that district expressed concern over the impact of littering and vandalism on the Ministry's highway maintenance operations program. The extent and nature of the problems are not well understood, nor are the full costs involved in maintenance due to littering and vandalism known.

PURPOSE

This is one of two projects undertaken in parallel to examine the problems of littering and vandalism on Ontario highways and other transportation facilities. The project is a first step on the issue of littering and vandalism and is based on existing file information and the opinions of highway maintenance operations personnel. It is an in-house project which focuses primarily on assessing the costs of littering and vandalism on the highway system. Other components included determining the extent and nature of the problems, identifying characteristics of litter pick-up operations and vandalism repair operations, and obtaining suggestions for:

- controlling or reducing the problems,
- improving Ministry maintenance operations, and
- improving reporting practices.

A second project is being carried out through the university-based OJT-CRP program. It involves a review of the literature on countermeasures for littering and vandalism and relates this literature to highways and other transportation facilities. The information provided in the two projects will be combined to assess costs, identify appropriate countermeasures, examine some of the specific issues addressed, and suggest future actions.

APPROACH

The present study is primarily based on the opinions of people involved in the day-to-day h'ghway maintenance operation at the district and patrol level. A questionnaire survey of selected district maintenance staff was undertaken. Information was obtained from district engineers, district maintenance engineers, district maintenance supervisors, area patrol supervisors and patrol supervisors. The questionnaire design was based on prior discussions with highway maintenance operations staff at the head office and district offices in Toronto and Hamilton. (Seven people in total were consulted, ranging from the heads of maintenance management and maintenance methods through district maintenance engineers and supervisors to patrol supervisors.) Information on littering and vandalism-related charges and convictions was obtained from the Ontario Provincial Police (O.P.P.).

FINDINGS

Litter

Based on information obtained from the Highway Maintenance Office records, over $1.7 million was spent during the 1981-82 fiscal year on litter pick-up. This total represents about 3.7% of the total summer patrol operations. Litter pick-up costs have increased by about 35% over the past five years. Survey findings revealed that the costs of litter pick-up may be underestimated in many districts. It is estimated that an additional $36 000 was spent on litter pick-up and 11 000 "free" man hours of litter pick-up by inmates from correctional institutions was received.

Litter dropped by motorists was identified, province-wide, by the majority of respondents as a major source of the problem. Debris resulting from vehicle part/component failure, and falling from improperly covered vehicles were also frequently mentioned as major problems. Soft drink cans and fast-food drink containers were the items most commonly identified by respondents as major parts of the littering problem on the highway system in their particular areas.

Litter and littering were reported to vary with respect to time, season and location. Litter was a more serious problem on weekends and summer. It is also a problem in areas adjacent to such places as fast-food/take-out restaurants, dumpsites, interchanges, service centres and built-up areas. Generally, litter was not related to particular events in patrol areas.

Respondents were also asked to make more subjective judgements on the nature of the problem and possible solutions. In general, respondents felt that the problem was either about the same as, or worse than it was three or five years ago. They made several suggestions regarding ways to control or reduce the amount of litter being deposited on the highway system. Suggestions most frequently mentioned were to increase enforcement, provide more litter receptacles, increase both the fines and the severity of penalties, provide publicity/advertising/education programs, and increase signing. Among the suggestions for improving litter pick-up operations while reducing costs were: using students, inmates, unemployed persons, and contracting pick-up operations to the private sector.

Vandalism

There is a lack of information on costs associated with vandalism along the highway system. Formal records are not kept by the Ministry, nor do the provincial police keep records of charges and convictions made in relation to vandalism on the highway system. Senior district maintenance staff were asked to estimate the total dollar expenditure by district staff on the repair and/or replacement of vandalized property. Several of these respondents either did not provide an estimate or found it difficult to do so. For the six districts where responses were given, cost estimates ranged from $2000 to $60 000 and totalled over $140 000. It should be pointed out that the six districts which provided estimates may not be representative of all the districts in the province; therefore, the results should be interpreted with caution.

Overall, respondents felt that signs were vandalized most often. Vandalism to signs included destruction, removal and graffiti. Other major targets and types of vandalism included stolen flags, stolen and damaged picnic tables, graffiti on rock-cuts and bridge-overpasses, and damaged buildings and trees.

Weekends, summer, and Halloween were identified as particular time periods when vandalism is a problem. Picnic sites and recreational areas were mentioned by several respondents as a particular location in their patrol area where vandalism is a problem. However, about one-quarter of the respondents stated that vandalism was not a locational problem and only a very small percentage of respondents felt that vandalism appeared to correlate with particular events in their respective areas.

Respondents were also asked to make more subjective judgements on the nature of the vandalism problem and its possible solution. Most respondents felt that the problem in their area today is about the same as, or worse than it was three or five years ago. Suggestions frequently mentioned which could control or reduce the amount of vandalism occurring to MTC property and the highway system, included increased enforcement, development of a publicity/advertising/educational campaign, and the institution of higher fines and stricter penalties. A few respondents made specific suggestions regarding sign repair operations which they felt would improve the efficiency of replacement or repair to vandalized property. A formalized reporting procedure was offered as a method which could improve the reporting of vandalism and help determine associated costs.

SUMMARY

It should be reiterated that this project is only a step in the overall review of the littering and vandalism problems. The project was based on existing file information and the opinions of various highway maintenance operations personnel. In this project, the nature of the problem was

examined, cost information was obtained, and judgements were requested regarding recent changes in the extent of the problems, possible countermeasures to alleviate these problems and methods for improving efficiency in these operational areas.

It was determined that MTC has a fairly good reporting procedure for litter pick-up costs, however, a comparable reporting procedure for vandalism does not exist. It was noted that reported pick-up costs may, in fact, underestimate the total costs. The study made an initial attempt at providing a more complete estimate of the actual costs of litter and a preliminary estimate of the costs of vandalism.

The information provided by this project will be combined with a parallel project reviewing relevant literature on countermeasures to provide a basis for identifying potential MTC countermeasures or actions in the areas of litter and vandalism.

1/ INTRODUCTION

1.1/ Background

A need for research on the littering and vandalism of Ontario highways was identified by senior highway maintenance personnel in the Hamilton District. A concern was expressed on the impact that littering and vandalism has on the Ministry's highway maintenance operations program. Littering and vandalism are not only associated with pick-up and replacement/repair costs but also with potential highway safety problems. The extent and nature of the problems are not well understood, nor are the full maintenance costs of these problems known.

1.2/ Purpose

This is one of two projects undertaken in parallel to examine the problems of littering and vandalism on Ontario highways and other transportation facilities. This in-house project is a first step in dealing with the issue of littering and vandalism, and is based on existing file information and on the opinions of highway maintenance operation personnel.

The objectives of this project are:

- To review current Ministry road maintenance records in order to identify the costs associated with litter clean-up and repair of vandalized property (i.e., an examination of what part of the overall roadway maintenance budget can be attributed to either).
- To gain a better understanding of the extent and nature of the problems.
- To collect data which will support decisions related to the development and assessment of various countermeasures.
- To identify options or suggestions to improve MTC maintenance operations and reduce the overall cost of these components of the budget.

A second project is being carried out through the university-based OJT-CRP program. It involves a review of the literature on countermeasures

for littering and vandalism and relates this literature to highways and other transportation facilities. The information provided in the two projects will be combined to assess costs, identify appropriate countermeasures, examine some of the specific issues addressed and suggest future actions.

1.3/ Approach

The present study is primarily based on the opinions of people involved in the day-to-day highway maintenance operations at the district and patrol level. A questionnaire survey of selected district maintenance staff was undertaken. Information was obtained from district engineers, district maintenance engineers, district maintenance supervisors, area patrol supervisors and patrol supervisors. The questionnaire was designed based on prior discussions with highway maintenance operations staff in head office and the district offices in Hamilton and Toronto. (In total seven people ranging from the heads of maintenance management and maintenance methods through to district maintenance engineers, supervisors and patrol supervisors were consulted). Information on littering and vandalism-related charges and convictions was obtained from the Ontario Provincial Police (O.P.P.).

1.4/ Questionnaire Design and Distribution

The questionnaire used in this study was developed by project staff in the Ergonomics Research Section. It was reviewed by appropriate highway maintenance staff in the Hamilton District and head office. The questionnaire (a copy is provided in the Appendix) was divided into two sections. The first section was designed to obtain an indication of the extent and nature of littering, and to get opinions on litter prevention, control and countermeasures. A second parallel section focused on vandalism.

The questionnaire was distributed to all patrol supervisors, all district maintenance supervisors, and the district engineer or the district maintenance engineer, in those districts where these positions exist. A total of 307 questionnaires were mailed out. District engineers were

also asked to circulate copies to other district personnel whom they felt could provide valuable input or insights into the study.

The questionnaires were distributed on August 3, 1982 and were to be returned for processing and analysis by August 25, 1982. Their distribution and return was co-ordinated by the district engineers. Each questionnaire was accompanied by a copy of a memorandum sent to district engineers informing them of the nature of the survey and requesting their co-operation and assistance (a copy of the letter is provided in the Appendix). To ensure a high response rate, telephone follow-up contacts were made with district maintenance personnel. As a result of delays in receiving questionnaires, the deadline for inclusion was extended to September 10, 1982.

1.5/ Report Organization

The survey results are reported in Section 2 and discussed in Section 3. In each case the sections are divided into two parts, one dealing with littering and the other with vandalism.

2/ FINDINGS

2.1/ Sample

A total of 256 questionnaires were completed by district maintenance staff throughout the province. The following list gives the distribution of respondents by title.

Title	Number
District Engineers	6
District Maintenance Engineers	3
District Maintenance Supervisors	13
Patrol Supervisors	225
Area Patrol Supervisors	9

Unless otherwise stated, the findings presented in this report are based on responses of the 256 people who completed and returned questionnaires. Information on costs of littering and vandalism were supplied by senior district maintenance staff (i.e., district engineers, maintenance engineers, maintenance supervisors).

Table 1 shows the distribution and return rate of completed questionnaires. Table 2 shows the distribution of respondents by district. As can be seen in the table, there appears to be adequate representation from all districts with the exception of North Bay. North Bay District maintenance office personnel felt it was sufficient to complete only one questionnaire from the district and consequently questionnaires were not distributed to patrol supervisors in the district.

The questionnaires returned by patrol supervisors were assigned a code based on the class of highway covered by the patrol. Maps of the districts with each patrol route outlined were used in assigning codes. The codes were:

- Freeways (400 series highways and the Q.E.W.),
- King's Highways (double digit series highways), and
- Secondary Highways (triple digit series highways).

In situations where more than one type of road class is covered by a patrol, the code assigned was subjectively based on the greater amount of

kilometre coverage of the respective road classes. As shown in Table 3, 65.1% of the patrols were classified as King's Highways, 19.5% as Secondary Highways and 15.3% as Freeways. The 41 respondents who were not patrol supervisors were not assigned a code.

2.2/ Litter

2.2.1/ Costs

One of the main reasons this study was initiated was that litter and debris clean-up and control were perceived to be a potential problem area for the Ministry, particularly in light of apparent escalating costs and budgetary restraints. As shown in Table 4, over $1.7 million was spent on litter pick-up during the 1981-82 fiscal year. This total represents a 9.2% increase over the amount spent in the previous fiscal year. The costs of litter pick-up increased almost 35% in the past five years. As shown in the table, districts with the highest expenditure on litter pick-up are typically those with a large urban centre, notably Toronto (24.7%), Hamilton (14.0%), Ottawa (11.7%), Chatham (Windsor) (7.6%) and Kingston (7.4%).

It is important to note that the expenditure on litter pick-up represents about 3.7% of the total summer patrol operations. Summer patrol operations included a variety of assignments such as surface and shoulder maintenance, roadside maintenance, drainage and structural maintenance, safety device maintenance, miscellaneous overhead, routine maintenance overhead and equipment maintenance (a more complete listing is provided in the Appendix). It should be pointed out that five years ago litter pick-up constituted about 4% of the total summer patrol operations.

Senior district highway maintenance operations staff were asked to indicate if they felt that the cost figures for litter pick-up in their district, in the fiscal year 1981-82, accurately reflected the actual costs of litter pick-up. Nine districts indicated that the costs were accurate whereas seven districts felt that the actual costs were underestimated. Opinions were not available from two districts.

The areas that were underestimated include use of non-Ministry staff, notably inmates from correctional institutions and litter pick-up occurring as part of the normal day-to-day responsibilities of patrol staff, where minor amounts of time spent on litter pick-up are not charged to litter operational codes. With respect to the use of inmates, MTC does not pay them for their services as special arrangements are made through the Ministry of Correctional Services. Litter and debris pick-up resulting from minor accidents was also mentioned as a source of hidden costs. For the seven districts reporting higher than official estimates, the total difference was $36 000. In addition, it was estimated that MTC received about 11 000 "free" man hours of litter pick-up service through a program with the Ministry of Correctional Services.

It should be noted that no distinction was made between work which the crew was specifically assigned and litter pick-up which is accomplished at a time which would otherwise be standby duty. A large number of standby hours were reported (70 000 h - summer, 183 000 h - winter) when no operations were possible. This was reportedly mainly due to weather conditions, lack of staff for major projects, special equipment not being available, and other delays. Litter pick-up is a prime operation for these periods as special equipment and large crews are not necessary.

2.2.2/ Extent

A majority of respondents (65.6%) felt that litter was a moderate problem. As shown in Table 5, 17.2% felt it was a major problem and 15.6% felt it was a minor problem.

Respondents also indicated that the litter problem in their area today, relative to the litter problem three to five years ago, was either about the same (48.8%) or worse (40.6%). As shown in Table 6, only 19 people (7.4%) felt that litter had become less of a problem in their area. No particular pattern of responses was observed between districts, classes of highway or respondent classification.

2.2.3/ Litter Deposit

Litter and debris can be deposited on the highway system in a number of ways. Respondents were provided with a list of ways in which litter can be deposited and were asked whether each of the ways listed was a major problem in their area. Province-wide, litter dropped by motorists was identified by the majority of respondents as a major source of the problem. As shown in Table 7, litter dropped by motorists was considered a problem by 79.7% of the respondents. Debris resulting from vehicle part/component failure (50.8%) and debris falling from improperly loaded vehicles (42.6%) were the second and third most frequently mentioned source of the problem.

2.2.4/ Types

Respondents were asked to indicate whether specific types of litter were a major part of the litter and debris problem on the highway system in their area. Table 8 is a list of the 10 types of litter identified by respondents to be a major part of the litter problem on the highway system over the entire province. As shown in the table, soft drink cans were the most frequently mentioned item (94.9%) followed by fast food/drink containers (84.0%). Liquor and wine bottles, animal carcasses, beer bottles, soft drink bottles, disposable diapers, other paper products, loose material from poorly loaded vehicles, and tire casings were also identified as major items.

2.2.5/ Time/Season

The littering problem appears to vary with respect to time (weekday-weekend) and seasons. Weekends, as shown in Table 9, are typically more of a problem than weekdays (63.7% versus 10.5%). Summer was identified by 81.3% of respondents as a period when littering occurs. Spring was mentioned by 41% of the respondents. Autumn and winter were considered less of a problem with respect to littering. It should be pointed out that long, holiday weekends were specifically mentioned as a time for such problems.

2.2.6/ Location

Littering was also reported to vary with respect to location. Over 71% of the respondents felt that litter was a problem at specific sites adjacent to their patrol area. These areas included fast-food take-out restaurants, locations near or on the route to dumpsites, interchanges, service centres and built up areas. Litter on King's and Secondary Highways was mentioned by 36.7% of respondents and Freeways by 18%. Picnic sites and recreational areas were mentioned by 28.5% of respondents (see Table 10).

2.2.7/ Event

Respondents generally did not feel littering was an event-related phenomenon. Only 23 respondents (9.0%) felt litter was related to special events. As shown in Table 11, of the 23 respondents who did feel littering was event related, 11 (47.8%) mentioned exhibitions and fairs, and five (21.6%) people mentioned parades. Other events were mentioned less frequently.

2.2.8/ Emphasis on Litter Control and Prevention

Respondents were asked about the emphasis placed on litter prevention and control by their district and head office. Although the question calls for a subjective judgement, respondents generally felt that head office, when compared with the districts, places less emphasis on litter prevention and control. There is a strong concensus that the police are not placing sufficient emphasis on the enforcement of litter laws. (See Tables 12, 13 and 14).

Supplementary information from a summary of provincial statistics on highway littering charges and convictions over the past five years (1977-1981) was obtained from the O.P.P. As shown in Table 15, in 1981, there were 636 people charged for littering and 98% of those charged were convicted. The average number of charges for litter during the period 1977 to 1981 was 688 and the conviction rate was 93.3%

2.2.9/ Litter Countermeasures -- Prevention and Control

Respondents suggested a number of alternatives for controlling or reducing the amount of litter being deposited on the highway system. The suggested methods are listed in Table 16. As shown in the table, the most frequently mentioned method of litter prevention and control was greater enforcement. Approximately 24% of the total suggestions were for increased enforcement. Litter receptacles were the second most frequently mentioned suggestion, representing 21.9% of the total responses. Respondents commented on the need for more receptacles and for a more strategic location for them (several respondents mentioned placing them on the right-of-way at pre-determined intervals where it was safe for drivers to pull off the road to deposit their litter). Some respondents also felt that the Ministry should obtain receptacles similar to the "ORBIT" containers used in Western Canada.

An equal proportion of the responses (14.4%) were suggestions for increasing fines and penalties, and for advertising and education. Several district staff wanted the level of fines to be reinstated to the $50 level instead of the present $28, and several others mentioned penalizing violators by assigning them to pick-up litter for a specified length of time. Publicizing the cost of litter pick-up, publishing violators' names in a local paper and providing educational programs that would be directed at school children were specific suggestions made on the means of combating this problem.

Increased signing represented 11.9% of the total responses. Some specific suggestions were to increase the number of signs informing the driving public of penalties and indicating where litter could be deposited.

Other suggestions, which were mentioned less frequently, included having returnable soft drink cans, and liquor and wine bottles (by means of a deposit system); a more thorough inspection of truck tires and a ban on retread tires; pressuring fast-food outlets to be more responsibile for the control of litter; distribution of car litter bags; keeping dumpsites open on all days of the week; periodically covering dumpsites with sand; and placing an outright ban on handbill advertising.

2.2.10/ Operational Improvements

Several respondents offered suggestions regarding steps that could be taken to improve the litter and debris removal operation or reduce the cost of the operation.

As shown in Table 17, 54.3% of the responses suggested using non-Ministry staff in litter pick-up operations. Students, inmates and unemployed persons were identified as groups of people who could be used at a significantly lower cost. Suggestions for private pick-up operations represented 13% of the total responses. As shown in the table there were a variety of other suggestions as well, ranging from reducing the size of the team and equipment used (exclusive two-man operations, use of smaller vehicles in transport, use of smaller garbage bags) to general environmental considerations such as a reduction on grass cutting requirements, paving the right-of-way and difficult access areas.

2.2.11/ Reporting

Respondents were asked for suggestions regarding methods that could be used to improve the reporting of litter and debris pick-up. Responses referred to both MTC reporting practices and methods for encouraging the public to report acts of littering. As shown in Table 18, the most frequently mentioned suggestion (representing 35.7% of the total responses) was to encourage the public to report either acts of littering or places where litter is a problem. Having a simpler reporting procedure represented 28.6% of the responses. Other suggestions given by respondents are shown in Table 18.

2.3/ Vandalism

2.3.1/ Costs

Unlike litter pick-up costs, the costs associated with the repair or replacement of Ministry property as a result of vandalism are unknown. There is no formalized reporting procedure for specific acts of vandalism. Repair costs are charged under different operational numbers. For

example, removing graffiti from bridges would be charged under a bridge maintenance operation number; replacing of signs would be charged under a sign maintenance operation number.

District engineers, district maintenance engineers and district maintenance supervisors were asked to estimate the total number of man-hours spent by all their district staff on the repair and/or replacement of vandalized property, and estimate the total cost. Several respondents said it was too difficult to provide an accurate estimate of man-hours or costs. However, for the six districts where estimates were given, it was estimated that 4050 man-hours (range 100-2000 hours) were spent on repairs which were made necessary by acts of vandalism with a total estimated expenditure of $140 500 (range $2000-$60 000). It should be pointed out that the six districts which provided estimates may not be representative of all the districts in the province, therefore, the results should be interpreted with caution.

2.3.2/ Extent

As shown in Table 19, most respondents considered vandalism a moderate or minor problem in their area (44.1% and 40.6% respectively). Sixteen respondents (6.3%) felt it was a major problem and 14 respondents (5.5%) felt that vandalism was not a problem. No particular pattern of responses was observed between districts, classes of highway or respondent classification.

Most respondents (55.5%) felt the vandalism problem in their area today, as compared to three to five years ago, was about the same. As shown in Table 20, about 29% felt it was worse and only 9% considered the situation better.

2.3.3/ Types -- Targets

Respondents were provided with a list of the types of vandalism acts and targets of vandals and asked if these were a major part of the vandalism problem on the highway system and on the MTC property in their area. Table 21 lists the 10 target-types most frequently mentioned by

respondents throughout the province. As shown in the table, signs are vandalized most often. Damaged or broken signs were mentioned by 72.7% of respondents, stolen signs by 72.3% and graffiti on signs by 43.7%. Other targets of vandalism include stolen and damaged picnic tables, graffiti on rock cuts and bridges/overpasses, and damaged buildings and trees.

2.3.4/ Time/Season

As was the case with littering, vandalism is reported to vary with respect to the time of the week and season of the year. Weekends were considered more of a problem than weekdays (mentioned by 65.6% of the respondents versus 5.1%) and summer (mentioned by 66.0% of the respondents) was identified as the worst season holiday weekends were stressed by respondents as periods when acts of vandalism occur frequently. Halloween was identified by 42.2% of the respondents as a time when vandalism is a problem.

2.3.5/ Location

Picnic sites and recreational areas were identified by 32% of respondents as a particular location in their patrol area where vandalism is a problem. Vandalism to Ministry property on the King's and Secondary Highways was mentioned by 31.3% of the respondents. Other locations where vandalism occurs were identified as patrol-yards, kiosks, property adjacent to specific area features (see Table 23 for more detail), freeways and truck inspection stations. It should be pointed out that about 24% of respondents expressed that vandalism was not related to location.

2.3.6/ Event

Vandalism was not generally considered to be event related. Only 10 respondents (3.9%) stated that vandalism was related to special events. Specific events mentioned included festivals, school graduations, harvest time, races, summer camp and the hunting season (see Table 24).

2.3.7/ Emphasis on Vandalism Control and Prevention

Respondents were asked about the emphasis placed on vandalism prevention and control by their district and head. Although the question calls for a subjective judgement, respondents generally felt that as compared with the districts, head office places less emphasis on vandalism prevention and control.

Respondents were equally divided in their responses to police emphasis on enforcement of laws related to vandalism on the highway system. An equal number of respondents felt the right amount of emphasis was given and similarly not enough emphasis given. One respondent felt there was too much emphasis (see Tables 25, 26 and 27). It should be pointed out that the Ontario Provincial Police do not keep statistics on specific acts or occurrences of vandalism on the highway system. Therefore, the number of charges and the conviction rates are unknown.

Most respondents (67.8%) felt that there was adequate time and resources in the normal course of daily activities to effect repairs to vandalized property. The remaining 32.2% expressed that repairs to vandalized property generally had a lower priority and were done only after other tasks were completed. However, respondents emphasized that priority in any event is given to the repair and replacement of regulatory signs.

2.3.8/ Countermeasures -- Prevention and Control

A number of suggestions were made by respondents to control or reduce the amount of vandalism to Ministry property. As shown in Table 29, 32.6% of the responses were for increased enforcement. This category includes enforcement by both the O.P.P. and MTC patrols. Specific references were made to increase enforcement or patrols at times when vandalism is most likely to occur e.g., during Halloween, at night, on long weekends or during the summer.

Advertising and education represented 17.4% of the total responses. Specific types included publishing violators' names in local newspapers and informing the public of how much is spent on repairing vandalized property.

Instituting higher fines and penalties (e.g., having the violator pay the total cost of repair including manpower costs) represented 16.3% of the total suggestions.

Other suggestions mentioned included improvements to signs (posting, locations, make and number), improved lighting, improvements to picnic areas, fencing, better identification of Ministry property, installating alarms, locking equipment, encouraging of the public to report vandalism and the establishing curfews.

2.3.9/ Efficiency of Repair

Eleven people made suggestions to improve the efficiency of repairs to or replacement of vandalized property. The suggestions made are listed in Table 30. Many of the suggestions shown in the table concern sign repair and include having a special sign repair crew, having all signs fabricated in the district, and the stocking of signs to avoid unnecessary time delays. Other suggestions were to have repairs done on a private basis and to give patrol staff the responsibility of repairing damage which resulted from minor acts of vandalism wherever possible.

2.3.10/ Reporting

Some respondents made specific suggestions to improve the reporting of vandalism. Seven suggestions (50.0%) were directed at formalizing the reporting procedure. Specific reference was made to having operation numbers for different types of vandalism, for example, a special sign repair number. Five suggestions (35.7%) concerned encouraging the public to report specific acts of vandalism. Two suggestions (14.3%) were to put the Ministry's logo and the appropriate contact person's name and telephone number on MTC property so that the public could more easily report the theft or damage of property (see Table 31.)

3/ DISCUSSION

3.1/ Litter

Litter pick-up in the fiscal year 1981-82 was a $1.7 million operation. Litter pick-up operations in that time period represented about 3.7% of the total expenditure on summer maintenance operations. Figures for the past five fiscal years revealed that although costs have risen by about 35%, the proportion of funds allocated to litter pick-up relative to the total summer maintenance budget have declined from 4% to 3.7%.

In conducting this study it became apparent that MTC has a fairly good reporting procedure for litter costs. However, prior to the survey several maintenance operations staff indicated that the total costs of litter pick-up operations in many districts may be underestimated. Survey results confirmed this assertion. In fact it was estimated that an additional $36 000 was spent on MTC litter pick-up. In addition, it was estimated that MTC received about 11 000 "free" man hours of litter pick-up service.

The rising cost of litter pick-up and the decline in the proportion of funds allocated to litter should be examined in light of the survey's results which indicates that over 40% of the respondents judged the litter problem to be worse now than five years ago. These results tend to support a concern that MTC may not be dealing with the litter problem adequately.

A number of suggestions were made by respondents which would either reduce or control the extent of littering. Survey responses revealed that a majority of respondents felt the police underemphasized the enforcement of litter and debris laws. Therefore, it is not surprising that the most frequently mentioned suggestion to control or reduce littering was to increase enforcement by both the Ministry and O.P.P. patrols.

Respondents identified certain time periods and places where littering commonly occurs, and several respondents were proponents of selective enforcement. Many respondents also felt that greater enforcement should

be coupled with increasing the level of fines and/or severity of the penalty.

Several respondents felt that there was an inadequate supply of litter containers or litter drop-off points in the province. Some specific suggestions were to have litter drop-off areas located at regular intervals along highways where motorists can safely pull off the roadway, deposit their litter in "improved litter receptacles" and drive away with minimum delay. Suggestions were made to discontinue the use of the 45 gallon drums as litter containers and replace them with containers similar to those used in Western Canada. It was expressed that brightly coloured, attractive receptacles may encourage usage, and in turn, they would have aesthetic qualities which would improve the roadside environment.

Improved signing, by means of having more signs informing the public where litter could be deposited e.g., "Litter drop-off area 1 km ahead" and of the regulations regarding littering in the province were also frequently suggested by respondents. It was suggested that in radio and television advertising, the content of the messages could be "what it costs you the taxpayer to pick-up litter". The suggestion for an educational program directed at school age children can also be considered. The publishing of violator's names in the local area newspaper was also suggested.

Litter and debris falling from improperly loaded vehicles or as a result of a part failure, especially from trucks, was identified as a major problem in many areas of the province. Suggestions included more stringent inspection of trucks at inspection stations with the use of special equipment that can detect tire problems and ensure that all trucks are covered in compliance with the covered truck regulations.

Litter from adjacent properties, notably dumpsites and fast-food take-out places, was also considered by respondents to be a major concern. Respondents, countered this problem by suggesting that dumpsites be covered and that individuals or businesses should be wholly or partially responsible for the cost of litter pick-up.

It was suggested that a letter sent by the Ministry should encourage fast food outlets and take-out establishments to provide more on-premises litter receptacles and to take more responsibility for the littering problem. Implementing a tax on establishments based on their "potential to create litter" (similar to a program that exists in several states in the United States) was suggested as another method for establishing a sense of responsibility with these establishments for the litter problem. Similarly, a litter tax on soft drink manufacturers and liquor and wine suppliers could be applied and used to offset pick-up costs. Respondents also suggested making these items returnable by placing a deposit on them at the time of purchase.

The survey identified options to improve operational aspects of litter pick-up thereby reducing costs. Respondents indicated that the use of students, inmates and the unemployed would be sources of cheap labour thus reducing overall costs, and creating temporary, and seasonal jobs. This would allow Ministry personnel additional time to allocate to other activities requiring more specialized skills. It was also suggested that smaller vehicles and crews be used wherever possible.

3.2/ Vandalism

Neither MTC nor the provincial police maintain formal records on vandalism along the highway system. Even with the results of this survey, it is clear that we still do not have a good appreciation of the extent and costs of vandalism. More information on vandalism is needed in order to make a thorough assessment of the problem. However, survey findings revealed that the costs could potentially be very large. From six districts, it was estimated that 4050 man-hours were spent during the 1981-82 fiscal year on repairs made necessary by acts of vandalism, with a total estimated expenditure of $140 500 (range $2000 - $60 000).

It was determined that certain types of vandalism are typically found in specific areas within districts. For example, graffiti on rock cuts occurs only in areas where rock cuts exist. However, for other than specific items, little difference was observed between districts with respect to assessing the vandalism problem.

Survey results indicated that signs are a major target of vandalism and that characteristics of certain times, seasons and locations attract vandalism.

Several survey respondents offered suggestions that may contribute to a reduction in vandalism. These included increasing enforcement, especially at times and locations where vandalism is reported likely to occur (e.g., summer, long weekends, Halloween, picnic sites) and higher penalties and fines.

Improving lighting of patrol yards, installing alarms, and locking up all Ministry equipment and fenced yards were also suggested.

Table 1/ Distribution of Respondents by Title

Title	Distributed/ Expected	Returned		
	Number	Number	% of Sample	Return rate (%)
District Engineers	12	6	2.3	50.0
District Maintenance Engineers	6	3	1.2	50.0
District Maintenance Supervisor	19	13	5.1	68.4
Patrol Supervisors	270	225	87.9	83.3
Area Patrol Supervisors	-	9	3.5	-
Total	307	256	100.0	

Table 2/ District Distribution of Respondents

District	Number	Percentage
1. Chatham	10	3.9
2. London	16	6.3
3. Stratford	16	6.3
4. Hamilton	15	5.9
5. Owen Sound	17	6.6
6. Toronto	16	6.3
7. Port Hope	15	5.9
8. Kingston	20	7.8
9. Ottawa	17	6.6
10. Bancroft	14	5.5
11. Huntsville	15	5.9
13. North Bay	1	0.4
14. New Liskeard	12	4.7
16. Cochrane	9	3.5
17. Sudbury	15	5.9
18. Sault Ste. Marie	16	6.3
19. Thunder Bay	19	7.4
20. Kenora	13	5.1
Total	256	100.0

Table 3/ Distribution of Respondents by Road Classification*

Road Classification	Number	Percentage
1. Freeways	33	15.3
2. King's Highways	140	65.1
3. Secondary Highways	42	19.5
Total	215	100.0

* Excludes the 41 respondents who were not patrol supervisors.

Table 4/ Litter Pick-up Costs

FISCAL YEAR 1981-82

District	Location	Continuous Litter Pick-up ($)	Spot Litter Cost ($)	Total Cost ($)	Percentage
1.	Chatham	75 567	55 874	131 441	7.6
2.	London	52 301	45 390	97 691	5.7
3.	Stratford	12 105	60 583	72 688	4.2
4.	Hamilton	76 870	163 993	240 863	14.0
5.	Owen Sound	37 680	38 240	75 920	4.4
6.	Toronto	138 525	287 853	426 378	24.7
7.	Port Hope	35 000	29 591	64 591	3.8
8.	Kingston	74 828	52 071	126 899	7.4
9.	Ottawa	83 452	119 177	202 629	11.7
10.	Bancroft	15 172	16 788	31 960	1.8
11.	Huntsville	9 377	20 151	29 528	1.7
13.	North Bay	4 700	15 089	19 789	1.1
14.	New Liskeard	1 625	24 702	26 327	1.5
16.	Cochrane	7 351	10 010	17 361	1.0
17.	Sudbury	29 508	27 489	56 997	3.3
18.	Sault Ste. Marie	5 265	24 821	30 086	1.8
19.	Thunder Bay	21 541	16 214	37 755	2.2
20.	Kenora	24 393	11 179	35 572	2.1
Total		705 260	1 019 215	1 724 475	100.0

Expenditure in Past Five Years

Year	1981-82	1980-81	1979-80	1978-79	1977-78
$ Expenditure	1 724 475	1 579 180	1 419 520	1 325 846	1 278 644
% Increase	9.20	11.25	7.06	3.69	- - -
Expenditures as a percentage of summer patrol operations	3.72	3.69	3.76	3.99	3.99

Table 5/ Extent of Litter Problem

Extent	Number	Percentage
No Problem	1	0.4
Minor Problem	40	15.6
Moderate Problem	168	65.6
Major Problem	44	17.2
No Comment	3	1.2
Total	256	100.0

Table 6/ Litter Problem Today Relative to Situation Three to Five Years Ago

Relative Situation	Number	Percentage
Better	19	7.4
Same	125	48.8
Worse	104	40.6
Can't Say	6	2.3
No Comment	2	0.8
Total	256	100.00

Table 7/ Sources of Litter on the Highway System

Source	Number	Percentage*
Dropped by Motorist	204	79.7
Falling from Improperly Loaded Vehicles	109	42.6
Result of Vehicle Part Failure	130	50.8
Result of Accident with Animals	87	34.0
Blown by Wind or Dropped from Adjacent Properties	56	21.9
Result of Accident with Other Vehicles	35	13.7
Other	25	9.8

* More than one answer was permitted, percentage based on the total sample of people (256).

Table 8/ Litter Types

Types	Number	Percentage *
Soft Drink Cans	243	94.9
Fast Food/Drink Containers	215	84.0
Liquor/Wine Bottles	203	79.3
Animals	201	78.5
Other Paper (cigarette packages, tissues etc)	200	78.1
Beer Bottles	195	76.2
Soft Drink Bottles	169	66.0
Disposable Diapers	167	65.2
Loose Material from Poorly Loaded Vehicles	163	63.7
Tire Casing	161	62.9

* More than one answer was permitted, percentage based on the total number of respondents (256).

Table 9/ Litter as a Time Related Problem

Time Period	Number	Percentage *
Summer	208	81.3
Autumn	26	10.2
Winter	6	2.3
Spring	105	41.0
Weekends	163	63.7
Weekdays	27	10.5
Other Time Period	15	5.9
Not a Time Related Problem	14	5.4

* More than one answer was permitted, percentage based on total number of respondents (256).

Table 10/ Litter as a Location Problem

Location	Number	Percentage *
Freeways	46	18.0
Kings Highways/Secondary Highways	94	36.7
Picnic Sites/Recreational Areas	73	28.5
** Near Specific Business/ Industries/Schools/ Intersections	182	71.1
Not a Locational Problem	20	7.8

* More than one answer was permitted, percentage based on total number of respondents (256)

	Number	Percentage
**Fast Food/Take Out Restaurants	55	30.2
Routes to Dumps/Near Dumpsites	30	16.6
Near Built up Areas/Just Outside of Town/City Limits	23	12.6
Interchanges/Intersections/Ramps	16	8.8
Service Centres/Truck Stops	13	7.2
Specific Business/Industrial Section	7	3.8
Schools/School Bus Stops	7	3.8
Fishing Areas	4	2.2
Near Sand/Gravel Pit	1	0.5
Not Specified	26	14.3
Total	182	100.0

Table 11/ Litter Related to Special Events

Event	Number	Percentage
Parades	5	21.6
Races	1	4.4
Exhibition/Fairs	11	47.8
Elections	2	8.7
Dances	1	4.4
End of School	2	8.7
Not Specified	1	4.4
Total	23	100.0

Table 12/ District Emphasis on Litter/Debris Prevention and Control

Emphasis Level	Number	Percentage *
Too Much Emphasis	0	0.0
Right Amount of Emphasis	171	70.1
Not Enough Emphasis	73	29.9
Total	244	100.0

* Percentage based on number of respondents answering.

Table 13/ Head Office Emphasis on Litter/Debris Prevention and Control

Emphasis Level	Number	Percentage *
Too Much Emphasis	1	0.4
Right Amount of Emphasis	142	58.4
Not Enough Emphasis	100	41.2
Total	243	100.0

* Percentage based on number of respondents answering.

Table 14/ Police Emphasis on Enforcement of Litter and Debris Laws

Emphasis Level	Number	Percentage *
Too Much Emphasis	0	0.0
Right Amount of Emphasis	44	17.8
Not Enough Emphasis	203	82.2
Total	247	100.0

* Percentage based on number of respondents answering.

Table 15/ Provincial Summary Statistics on Litter Charges and Convictions

Year	Charged	Convicted	Percentage Convicted
1981	636	623	98.0
1980	742	684	92.2
1979	661	614	92.9
1978	721	659	91.4
1977	678	630	92.9
Average	688	642	93.3

Table 16/ Suggested Methods of Litter/Debris Prevention and Control

Method	Number	Percentage*
Greater Enforcement	87	23.6
Receptacles	81	21.9
Increase in Fines/Penalties	53	14.4
Publicity/Advertising/Education	53	14.4
Signing	44	11.9
Returnable/Deposit on Cans/Liquor Bottles	26	7.0
Greater Inspection of Tires/Ban Retread Tires	8	2.2
Pressure Fast Food Outlets/Letters to Take-Outs	8	2.2
Distribute Car Litter Bags	4	1.1
Open Dumpsites 7 Days a Week/Sand Dumpsites	4	1.1
Ban Handbill Advertising	1	0.2
Total	369	100.0

*Based on a percentage of total responses.

Table 17/ Suggested Operational Improvements

Method	Number	Percentage
Use non-MTC staff (Students, Inmates, Unemployed)	25	54.3
Private Pick-up Operations	6	13.0
Don't Pick-up Litter	3	6.5
Allow More km Coverage on Operations	2	4.3
Cutback Grass Cutting	2	4.3
Pave Right-of-Way, Difficult Access Areas	1	2.2
Have Tow-Truck Operators Clean up After Accidents	1	2.2
Allow Burning on Right-of-Way	1	2.2
Provide Garbage Bag Inserts For Garbage Containers	1	2.2
Obtain Vacuum Units with Flexible Hoses	1	2.2
Use Smaller Garbage Bags	1	2.2
Use Smaller Vehicles	1	2.2
Use Two-Man Operations	1	2.2
Total	46	100.0

Table 18/ Suggested Improvements in Reporting Littering

Method	Number	Percentage
Encourage the Public to Report	5	35.7
Simpler Report/One Number	4	28.6
Reporting Litter Cans per km	2	14.3
Provide Patrol Figures	2	14.3
Classify Each Patrol Area	1	7.1
Total	14	100.0

Table 19/ Extent of the Vandalism Problem

Method	Number	Percentage
No Problem	14	5.5
Minor Problem	104	40.6
Moderate Problem	113	44.1
Major Problem	16	6.3
No Comment	9	3.5
Total	256	100.0

Table 20/ Comparison of the Vandalism Problem Today to the Situation Three to Five Years Ago

Relative Situation	Number	Percentage
Better	23	9.0
Same	142	55.5
Worse	74	28.9
Can't Say	7	2.7
No Comment	10	3.9
Total	256	100.0

Table 21/ Types/Targets of Vandalism

Object	Number	Percentage*
Damaged/Broken Signs	186	72.7
Removed/Stolen Signs	185	72.3
Removed/Stolen Flags	130	50.8
Graffiti on Signs	112	43.7
Removed/Stolen Picnic Tables	106	41.4
Graffiti on Rock Cuts	103	40.2
Damaged/Broken Picnic Tables	73	28.5
Graffiti on Bridges/Overpasses	51	19.9
Damaged Buildings	23	9.0
Damaged Trees	20	7.8

*More than one answer was permitted, percentage based on the total sample of people (256).

Table 22/ Vandalism as a Time Related Problem

Time Period	Number	Percentage*
Summer	169	66.0
Autumn	33	12.9
Winter	6	2.3
Spring	21	8.2
Weekends	168	65.6
Weekdays	13	5.1
Halloween	108	42.2
Other Time Period	23	9.0
Not a Time Related Problem	31	12.1

*More than one answer was permitted, percentage based on the total sample of people (256).

Table 23/ Vandalism as a Locational Problem

Location	Number	Percentage
Freeways	11	4.3
King's Highways/Secondary Highways	80	31.3
Picnic Sites/Recreational Areas	82	32.0
**Adjacent to Specific Areas/Features	59	23.0
Truck Inspection Stations	10	3.9
Patrol Yards/Kiosks (Stockpiles)	37	14.4
Not a Locational Problem	61	23.8

*More than one answer was permitted, percentage based on the total sample of people (256).

	Number	Percentage
**Built up areas	16	27.1
Schools/School Bus Stops	10	16.9
Interchanges/Ramps	8	13.6
Hotels/Resorts	3	5.1
Business Sections	3	5.1
Wooded Areas	3	5.1
Indian Reserve	2	3.4
District Headquarters	1	1.7
Not Specified	13	22.0
Totals	59	100.0

Table 24/ Vandalism Related to Special Events

Event	Number	Percentage
Harvest	1	10.0
School Graduations	1	10.0
Festivals	3	30.0
Summer Camp	1	10.0
Races	2	20.0
Hunting Season	1	10.0
Not Specified	1	10.0
Total	10	100.0

Table 25/ District Emphasis on Vandalism Prevention and Control

Emphasis Level	Number	Percentage*
Too Much Emphasis	0	0.0
The Right Amount of Emphasis	198	82.5
Not Enough Emphasis	42	17.5
Total	240	100.0

*Based on the number of respondents answering.

Table 26/ Head Office Emphasis on Vandalism Prevention and Control

Emphasis Level	Number	Percentage*
Too Much Emphasis	0	0.0
The Right Amount of Empnasis	157	67.7
Not Enough Emphasis	75	32.3
Total	232	100.0

*Based on the number of respondents answering.

Table 27/ Police Emphasis on Enforcement of Laws Related to Vandalism on the Highway System

Emphasis Level	Number	Percentage*
Too Much Emphasis	1	0.4
The Right Amount of Emphasis	121	49.8
Not Enough Emphasis	121	49.8
Total	243	100.0

*Based on the number of respondents answering.

Table 28/ Assessment of Time and Resources Available for Repair Vandalized Property

Category	Number	Percentage*
Adequate Time and Resources	160	67.8
Done Only After Other Tasks Completed	76	32.2
Total	236	100.0

*Based on the number of respondents answering.

Table 29/ Suggestions to Control or Reduce or the Amount of Vandalism to MTC Property

Method	Number	Percentage*
Enforcement	60	32.6
Publicity/Advertising/Education	32	17.4
Higher Penalties/Fines	30	16.3
Signs - Improved Posting (special brackets, ties, steel, put foot posts in ground)	14	7.6
- Number/Make (Combine signs, fewer signs, more metal signs)	7	3.7
- Location (move signs off the shoulder)	4	2.2
Improve Lighting	9	4.9
Picnic Areas - Tables (tie down, make out of concrete)	6	3.3
- Close Sites	2	1.1
Fencing	6	3.3
Put MTC ID on Property	5	2.8
Install Alarms	3	1.6
Lock Equipment Away	3	1.6
Encourage the Public to Report Violators/Reward	2	1.1
Have Curfews	1	0.5
Total	184	100.0

*Based on percentage of total responses.

Table 30/ Suggestions to Improve Efficiency of Replacement/Repair Related to Vandalized Property

Method	Number	Percentage
Have a Special Sign Repair Crew	3	27.2
Have all Signs Fabricated in the District	2	18.2
Stock Signs	2	18.2
Private Repair Operation	2	18.2
Have Patrol Staff Repair Minor Acts of Vandalism - Carry Proper Equipment	2	18.2
Total	11	100.0

Table 31/ Suggestions to Improve Reporting of Vandalism

Method	Number	Percentage
Formalize Reporting Procedure	7	50.0
Encourage Public to Report Vandalism/Reward	5	35.7
Put MTC Name and Phone Number of Contact Person on Property	2	14.3
Total	14	100.0

4/ APPENDIX

4.1/ Letter to District Engineers/Questionnaire

4.2/ MTC Maintenance Operation Codes

memorandum

Ontario

To: District Engineers

Date: August 3, 1982

From: Social and Policy Outlooks Office
Ergonomics Research Section
4th Floor, West Tower
Downsview, Ontario

Subject: Litter and Vandalism on the Highway System in Ontario

Littering and vandalism have been identified as two areas of concern in the Ministry's road maintenance program. The Social and Policy Outlooks Office is undertaking two studies initiated by Central Region with study review committee participation including the Maintenance Operations Office, which will make a preliminary examination of these concerns. One study focuses on assessing the annual costs of litter and vandalism on the highway system; the other is attempting to identify and assess various countermeasures to littering and vandalism. To assist us in our effort, we are asking your cooperation in ensuring that the attached questionnaires are distributed to and completed by the appropriate personnel, namely the District Engineer, or by the District Maintenance Engineer in those Districts where this position exists, the District Maintenance Supervisor and Patrol Supervisors.
An additional copy of the questionnaire being.used in this survey is attached for your information. If you feel that there are individuals other than the ones indicated who can provide valuable input as well, please ask them to complete and return a copy of this questionnaire to the address indicated on the first page of the questionnaire.

Thank you for your cooperation in this matter.

Paul Gorys
Project Manager

Encl: As above

PG/sp.

QUESTIONNAIRE

The Social and Policy Outlooks Office is conducting a survey of selected district maintenance personnel in order to obtain some preliminary data and get opinions concerning littering and vandalism on the highway system in Ontario. Please complete the attached questionnaire and return it to Mr. Paul Gorys, Social and Policy Outlooks Office, 4th Floor West Tower, 1201 Wilson Avenue, Downsview, Ontario.

If you have any questions please contact either Paul Gorys or Bob Rosenbaum at (416) 248-3571. The completed questionnaires should be returned to Mr. Gorys by August 25,1982. Please check to ensure that you have answered all questions. Your responses will be treated with strict confidence and will be reported in summary form only. Please feel free to attach any additional documentation you feel would be relevant to this study.

Name_____ District_____

Telephone _____ Title_____

Litter/Debris

1. Please indicate by checking the appropriate box, whether the types of litter/debris listed below are a major part of the litter/debris problem on the highway system in your area.

	Yes	No
a) tire casing	☐	☐
b) other vehicle parts and accessories (muffler, tailpipe etc)	☐	☐
c) truck equipment (skids, ropes, chains etc)	☐	☐
d) loose material from uncovered dump trucks	☐	☐
e) loose material from dump trucks with ineffective covers	☐	☐
f) loose material from other poorly loaded vehicles	☐	☐
g) liquor/wine bottles	☐	☐
h) soft drink bottles	☐	☐
i) beer bottles	☐	☐
j) beer cans	☐	☐
k) soft drink cans	☐	☐
l) newspapers/magazines	☐	☐
m) fast food/drink containers	☐	☐
n) other paper (cigarette packages,tissues etc)	☐	☐
o) bags of garbage	☐	☐
p) disposable diapers	☐	☐
q) animals	☐	☐
r) other _____ (please specify)	☐	☐

2. Litter/debris is deposited on the highway system in a number of ways. Please indicate by checking the appropriate box, if the ways listed below are a major problem in your area.

	A Major Problem	Not A Major Problem
a) dropped by motorists	☐	☐
b) falling from improperly loaded vehicles	☐	☐
c) result of vehicle part failure (tire casings, dropped muffler etc)	☐	☐
d) result of accident with other vehicles	☐	☐
e) result of accident with animals	☐	☐
f) blown by wind from adjacent properties	☐	☐
g) other _____ (please specify)	☐	☐

3. To what extent do you feel that litter/debris on the highway system in your area is a problem?

☐ Not a problem

☐ Minor problem

☐ Moderate Problem

☐ Major problem

4. In your opinion is the litter/debris 'problem' on the highway system in your area better or worse than it was 3 to 5 years ago?

☐ Better

☐ About the same

☐ Worse

☐ Can't say/Inapplicable

5. Are there particular times when litter/debris is more of a problem than at other times? Please check the appropriate boxes.

☐ No

☐ Yes, weekdays

☐ Yes, weekends

☐ Yes, summer

☐ Yes, autumn

☐ Yes, winter

☐ Yes, spring

☐ Yes, other _____ please specify

6. Are there particular locations in your area where litter/debris is a problem? Please check the appropriate boxes.

- ☐ No
- ☐ Yes, on freeways-expressways
- ☐ Yes, on King's Highways-Secondary Highways
- ☐ Yes, picnic sites - rest areas
- ☐ Yes, near particular businesses industries-schools _____ please specify which
- ☐ Yes, other, _____ please specify

7. Is litter in your area, at times, related to any special events such as fairs or exhibitions?

- ☐ Yes _____ _____ please specify
- ☐ No

8. In your opinion how much emphasis or concern does your district place on litter/debris prevention and control?

- ☐ Too much emphasis
- ☐ The right amount of emphasis
- ☐ Not enough emphasis

9. In your opinion how much emphasis or concern do head office maintenance operation personnel place on litter/debris prevention and control?

- ☐ Too much emphasis
- ☐ The right amount of emphasis
- ☐ Not enough emphasis

10. In your opinion, how much emphasis do the police give to enforcement of litter and debris laws?

- ☐ Too much emphasis
- ☐ The right amount of emphasis
- ☐ Not enough emphasis

11. What types of things could be done to control or reduce the amount of litter being deposited on the highway system in your district?

_____

_____

_____

12. Do you have any suggestions regarding types of things that could be done to improve litter and debris operation or reduce the cost of this operation?

_____

_____

_____

13. Do you have any suggestions regarding types of methods that could be used to improve the reporting of litter and debris pick-up?

_____

_____

_____

QUESTIONS 14 TO 17 ARE TO BE COMPLETED BY DISTRICT ENGINEERS-
DISTRICT MAINTENANCE ENGINEERS, AND MAINTENANCE SUPERVISORS.
ALL OTHERS PLEASE GO TO QUESTION 18.

14. Approximately $ was spent in your district in fiscal 1981/82 for continous and spot litter pick-up. This figure was obtained from the highway Maintenance Work Reporting System under Operation codes 3031 Litter Pick-up and 3032 Spot Litter Pick-up. Do you feel that the figure indicated above accurately reflects the actual costs of litter pick-up in your district?

☐ Yes.....go to Question 16

☐ No

if no, why not _____

_____

_____

15. What is your best estimate of the actual costs of litter/debris pick-up in fiscal year 1981/82?

$_____

16. In your district do you use other people besides MTC staff to pick-up litter? e.g. inmates, citizens on make work projects

☐ Yes _____ go to Question 17

☐ No .....go to Question 18

17. Please provide an estimate of the total man hours spent by people other than MTC staff on litter/debris pick-up in fiscal year 1981/82 and whose time is not charged to 3031 or 3032.

_____hours

Vandalism

18. Please indicate by checking the appropriate box, whether the types of vandalism listed below are a major part of the vandalism problem on the highway system/MTC property in your area.

		Yes	No
a	graffiti on signs	☐	☐
b)	" " noise barriers	☐	☐
c)	" " rock cuts	☐	☐
d)	" " bridges-overpasses	☐	☐
e)	" " retaining walls	☐	☐
f)	" " buildings	☐	☐
g)	" " vehicles	☐	☐
h)	" " other _____ (please specify)	☐	☐
i)	removed/stolen signs	☐	☐
j)	" vehicles	☐	☐
k)	" equipment	☐	☐
l)	" picnic tables	☐	☐
m)	" flags	☐	☐
n)	" flag poles	☐	☐
o)	" other _____ (please specify)	☐	☐
p)	damaged/broken signs	☐	☐
q)	" noise barriers	☐	☐
r)	" buildings (incl. windows, doors, etc.)	☐	☐
s)	" bridges-overpasses	☐	☐
t)	" vehicles	☐	☐
u)	" equipment	☐	☐
v)	" picnic tables	☐	☐
w)	" trees	☐	☐
x)	" other _____ (please specify)	☐	☐

19. To what extent do you feel that vandalism on the highway system/MTC property in your area is a problem?

☐ No problem

☐ Minor problem

☐ Moderate problem

☐ Major problem

20. In your opinion is vandalism on the highway system/MTC property in your area better or worse than it was 3 to 5 years ago?

- ☐ Better
- ☐ About the same
- ☐ Worse
- ☐ Can't say/Don't know

21. Are there particular times when vandalism is more of a problem than at other times ? Please check the appropriate boxes.

- ☐ No
- ☐ Yes, weekdays
- ☐ Yes, weekends
- ☐ Yes, summer
- ☐ Yes, autumn
- ☐ Yes, winter
- ☐ Yes, spring
- ☐ Yes, Halloween
- ☐ Yes, New Years Eve
- ☐ Yes, Other _____ (please specify)

22. Are there particular locations in your area where vandalism is a problem? Please check the appropriate boxes.

- ☐ No,
- ☐ Yes, on freeways
- ☐ Yes, other King's Highways
- ☐ Yes, picnic sites
- ☐ Yes, near particular businesses-industries-schools _____ (please specify which)
- ☐ Yes, at Truck Inspection Stations
- ☐ Yes, at Patrol Yards-Kiosks
- ☐ Yes, Other _____ (please specify)

23. Is vandalism in your area, at times, related to any special events such as fairs or exhibitions?

- ☐ Yes _____ (please specify)
- ☐ No

24. In your opinion, how much concern does your district place on vandalism prevention and control?

- ☐ Too much emphasis
- ☐ The right amount of emphasis
- ☐ Not enough emphasis

25. In your opinion, how much concern does head office maintenance operations personnel place on vandalism prevention and control?

☐ Too much emphasis

☐ The right amount of emphasis

☐ Not enough emphasis

26. In your opinion, how much emphasis do you feel police in your district give to the enforcement of laws related to vandalism of the highway system?

☐ Too much emphasis

☐ The right amount of emphasis

☐ Not enough emphasis

27. In your opinion is there adequate time and resources in normal maintenance activities to repair vandalized MTC property or are repairs done only after other tasks are completed?

☐ Adequate time and resources

☐ Done only after other tasks completed

28. What types of things could be done to control or reduce the amount of vandalism to MTC property-the highway system in your district?

_____

_____

_____

29. Do you have any suggestions regarding types of things that could be done to improve the efficiency of the replacement/repair related to specific types of vandalized property or reduce the cost of replacement/repair?

_____

_____

_____

30. Do you have any suggestions regarding types of things ie. methods, that could be done to improve the reporting of vandalism and associated costs to the Ministry?

_____

_____

_____

QUESTIONS 31 AND 32 ARE TO BE COMPLETED BY THE DISTRICT ENGINEERS-DISTRICT MAINTENANCE ENGINEERS, AND MAINTENANCE SUPERVISORS.

31. Could you provide an estimate of the total number of man hours spent by all your district staff on the repair and/or replacement of vandalized property?

_____ hours

32. Could you provide an estimate of the total dollar expenditure by district staff on the repair and/or replacement of vandalized property?

$_____

Thank you very much for completing this questionnaire. Please forward the questionnaire to Paul Gorys at the address noted at the top of the first page.

APPENDIX 4.3/ MTC MAINTENANCE OPERATION CODES

OPERATIONS GUIDE

OPERATION CODE	OPERATION DESCRIPTION	ACCOMPLISHMENT UNIT	CODE
	SURFACE MAINTENANCE		
1001	MANUAL PATCHING: PLACING AND SPREADING	tonne	27
1002	MACHINE PATCHING: PLACING AND SPREADING	tonne	27
1003	CRACK-FILLING	litre	09
1004	SPRAY PATCHING	litre	09
1005	ROUT AND SEAL: CONCRETE AND ASPHALT PAVEMENT	metre	38
1007	DRAGGING OR GRADING	kilometre	39
1009	GRAVELLING: GRAVEL SURFACES	cubic metre	09
1010	SPOT DUST LAYING: SURFACE	tonne	27
1011	DUST LAYING: SURFACE	kilometre	39
1012	CONCRETE PAVEMENT REAPIR: WITH CONCRETE	sq. metre	46
1014	MULCH PAVEMENT: MIXED IN PLACE	kilometre	39
1016	PRIMING: ROAD SURFACE	kilometre	39
1017	SURFACE TREATING	kilometre	39
1021	EARTHWORK	cubic metre	07
1022	ROCKWORK	cubic metre	07
1090	OTHER SURFACE OPERATIONS	----------	--
	SHOULDER MAINTENANCE		
2001	DRAGGING, (GRADING) SHOULDERS	kilometre	39
2003	SHOULDERING	cubic metre	07
2004	DROP-OFF REPAIR	metre	38
2005	WASHOUTS	----------	--
2006	GRAVEL WINDROW REMOVAL	number	52
2010	SPOT DUST LAYING: SHOULDERS	tonne	27
2011	DUST LAYING: SHOULDERS	kilometre	39
2012	REPAIR OF PAVED SHOULDER	----------	--
2990	OTHER SHOULDER WORK	----------	--
	ROADSIDE MAINTENANCE: MOWING		
3011	MOWING, MTC RIGHT-OF-WAY	hectare	47
3012	MOWING, ADJACENT TO SHOULDERS	hectare	47
3014	HAND MOWING	----------	--
3016	MOWING, MTC AREAS OUTSIDE RIGHT-OF-WAY	----------	--
	ROADSIDE MAINTENANCE: CLEANING		
3031	LITTER PICK-UP	kilometre	39
3032	SPOT, LITTER PICK-UP	----------	--
3033	MACHINE SWEEPING, NON-INTERSECTION	kilometre	39
3034	MANUAL SWEEPING, NON-INTERSECTION	----------	--
3035	MACHINE SWEEPING, INTERSECTIONS	number	52
3036	MANUAL SWEEPING, INTERSECTION	number	52
3039	ACCIDENTS	----------	--
	ROADSIDE MAINTENANCE - FENCING		
3050	FENCING, STANDARD WIRE	----------	--
3051	FENCING, SECURITY	----------	--
3055	VISUAL AND SOUND BARRIERS	----------	--

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OPERATION CODE	OPERATION DESCRIPTION	ACCOMPLISHMENT UNIT	CODE
	ROADSIDE MAINTENANCE - PARKS & PICNIC SITES		
3060	ROUTINE PARK AND PICNIC SITE MAINTENANCE	---------	--
3061	NON-ROUTINE PARK & PICNIC SITE MAINTENANCE	---------	--
3090	OTHER ROADSIDE OPERATIONS: EXCEPT LANDSCAPING	---------	--
	ROADSIDE MAINTENANCE - LANDSCAPING R.O.W.		
3201	WEED SPRAYING, USING TORDON	hectare	47
3202	WEED SPRAYING, USING THICKENED 2-4-D	hectare	47
3203	WEED SPRAYING, USING HERBICIDE-WATER SOLUTION	hectare	47
3204	WEED SPRAYING, APPLIED WITH MUSKEY TRACTOR	hectare	47
3211	BRUSH SPRAYING, USING TORDON	hectare	47
3212	BRUSH SPRAYING: USING HERBICIDE-WATER SOLUTION	hectare	47
3213	BRUSH SPRAYING: APPLIED WITH HAND EQUIPMENT	hectare	47
3214	SOIL STERILANT SPRAYING	hectare	47
3220	TREE PLANTING AND ESTABLISHMENT	number	52
3221	SHRUB AND SEEDLING PLANTING AND ESTABLISHMENT	---------	--
3222	MAINTENANCE OF TREES, SHRUBS AND SEEDLING	---------	--
3223	TREE REMOVAL	number	52
3224	BRUSH CUTTING	hectare	47
3225	TREE TRIMMING	---------	--
3228	GRASS SEEDING, USING POWER EQUIPMENT	hectare	47
3229	TURF MAINTENANCE	---------	--
3290	OTHER, LANDSCAPING	---------	--
	DRAINAGE MAINTENANCE		
5011	DITCHING, MATERIAL LOADED AND HAULED AWAY	metre	38
5012	DITCHING, MATERIAL DISPOSED OF AT SITE	metre	38
5015	DITCHING, ROADSIDE AND OFFTAKE, USING A GRADER	metre	38
5016	HAND DITCHING	---------	--
5017	REMOVAL OF BEAVER DAMS	---------	--
5020	STORM SEWER REPAIR	---------	--
5021	CLEANING STORM SEWERS	metre	38
5025	HAND CLEANING CATCH BASINS	number	52
5026	MACHINE CLEANING CATCHBASINS	number	52
5027	CURB AND GUTTER REPAIR AND INSTALLATION	---------	--
5029	OTHER DRAINAGE OPERATIONS	---------	--
	STRUCTURAL MAINTENANCE		
5039	BURLINGTON BAY AND GARDEN CITY SKYWAYS	---------	--
	STRUCTURAL MAINTENANCE: CULVERTS		
5041	CONCRETE CULVERTS	number	52
5042	METAL CULVERTS	number	52
5043	TIMBER CULVERTS	number	52
5045	CULVERT CLEANING	number	52

OPERATIONS GUIDE

OPERATION CODE	OPERATION DESCRIPTION	ACCOMPLISHMENT UNIT	CODE
	STRUCTURAL MAINTENANCE: BRIDGES		
5050	LIFT AND SWING BRIDGE MAINTENANCE	---------	--
5051	BRIDGE CLEANING	number	52
5052	BRIDGE HANDRAIL REPAIR	---------	--
5053	PAINTING STEEL BRIDGE STRUCTURES	litre	09
5054	BRIDGE DECK JOINT REPAIR	metre	38
5055	BRIDGE DECK WATER-PROOFING	sq. metre	46
5056	BRIDGE BEARING MAINTENANCE	---------	--
5057	REPAIR OF BRIDGE STEEL	---------	--
5058	REPAIR OF BRIDGE CONCRETE	---------	--
5059	REPAIR OF BRIDGE TIMER	---------	--
5060	BAILEY BRIDGES - INSTALLATION & MAINTENANCE	---------	--
5069	OTHER BRIDGE MAINTENANCE	---------	--
	SAFETY DEVICE MAINTENANCE: ZONE PAINTING		
6011	LANE LINE PAINTING - STANDARD TRAFFIC PAINT	kilometre	39
6012	EDGE LINE PAINTING - STANDARD TRAFFIC PAINT	kilometre	39
6013	PREMARKING	---------	--
6014	SPECIAL MARKING	---------	--
6015	LANE LINE PAINTING - HOT TRAFFIC PAINT	kilometre	39
6016	EDGE LINE PAINTING - HOT TRAFFIC PAINT	kilometre	39
	SAFETY DEVICE MAINTENANCE: ELECTRICAL		
6021	TRAFFIC SIGNALS AND CONTROLLERS: INSTALLATION	number	52
6022	TRAFFIC SIGNALS AND CONTROLLERS: INSPECTION	number	52
6023	TRAFFIC SIGNALS: REPAIR	number	52
6024	CONTROLLERS: REPAIR	number	52
6025	FLASHING BEACONS: INSTALLATION	number	52
6026	FLASHING BEACONS: INSPECTION	number	52
6027	FLASHING BEACONS: REPAIR	number	52
6029	OTHER WORK ON SIGNALS AND FLASHERS	--------	--
6031	ROADWAY ILLUMINATION: INSTALLATION	number	52
6032	ROADWAY ILLUMINATION: INSPECTION	number	52
6033	ROADWAY ILLUMINATION: REPAIR	number	52
6035	SIGN ILLUMINATION: INSTALLATION	number	52
6036	SIGN ILLUMINATION: INSPECTION	number	52
6037	SIGN ILLUMINATION REPAIR	number	52
6039	OTHER ILLUMINATION WORK	--------	--
	SAFETY DEVICE MAINTENANCE - SIGN ERECTION		
6041	DELINEATOR MAINTENANCE	number	52
6042	SMALL METAL SIGN: PLACEMENT/REPLACEMENT	sq. metre	46
6043	WOOD SIGN: PLACEMENT/REPLACEMENT	sq. metre	46
6044	EXTRUDED ALUMINUM SIGN: PLACEMENT/REPLACEMENT	sq. metre	46
6046	SIGN POST REPLACEMENT	number	52
6047	SIGN POST STRAIGHTENING	number	52
6049	OTHER SIGN ERECTION WORK	--------	--

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OPERATION CODE	OPERATION DESCRIPTION	ACCOMPLISHMENT UNIT	ACCOMPLISHMENT CODE
	SAFETY DEVICE MAINTENANCE - GUIDE RAIL		
6061	CABLE GUIDE RAIL POST: REPLACEMENT	number	52
6063	STRAIGHTENING CABLE GUIDE RAIL POSTS	number	52
6065	CABLE GUIDE RAIL: INSTALLATION	number	52
6067	STEEL BEAM GUIDE RAIL: MAINTENANCE	number	52
6068	STEEL BEAM GUIDE RAIL: INSTALLATION	number	52
6069	BOX BEAM GUIDE RAIL: MAINTENANCE	number	52
6070	BOX BEAM GUIDE RAIL: INSTALLATION	number	52
6071	INERTIAL BARRIER MODULES: MAINTENANCE	number	52
6072	INERTIAL BARRIER MODULES: INSTALLATION	number	52
6090	OTHER GUIDE RAIL MAINTENANCE	-------	52
	SAFETY DEVICE MAINTENANCE: SIGN MANUFACTURING		
6141	MANUFACTURING DELINEATORS	number	52
6142	MANUFACTURING SMALL STEEL SIGNS	sq. metre	46
6143	MANUFACTURING PLYWOOD SIGNS	sq. metre	46
6144	MANUFACTURING EXTRUDED ALUMINUM SIGNS	sq. metre	46
6145	MANUFACTURING SMALL ALUMINUM SIGNS	sq. metre	46
6147	SIGN POST PREPARATION	number	52
6148	MANUFACTURING OF STRANDS	number	52
6149	RECLAIMING SIGNS	sq. metre	46
6190	OTHER MANUFACTURING WORK	---------	--
	MISCELLANEOUS OVERHEADS		
1902	MAINTENANCE ADMINISTRATION	---------	--
1903	WAREHOUSE AND STORES	---------	--
1905	LANDS AND BUILDINGS MAINTENANCE	---------	--
1959	MUNICIPALITIES - SHAREABLE OR RECOVERABLE WORK	---------	--
3906	MISCELLANEOUS EXPENDABLE MATERIAL AND SUPPLIES	---------	--
	ROUTINE MAINTENANCE OVERHEADS: SUMMER		
3950	ROUTINE (SUMMER) ROAD PATROLLING	---------	--
3951	SUPERVISION	---------	--
3952	ROUTINE (SUMMER) PAPERWORK	---------	--
3953	PREPARATION TIME: SERVICES CREW ONLY	---------	--
3955	TRAFFIC PATROLLING: (EMERGENCY ROAD SERVICE)	---------	--
3961	HOUSEKEEPING AND YARD MAINTENANCE (SUMMER)	---------	--
3962	STOCKPILING AGGREGATE	cubic metre	07
3964	CRUSHING AND STOCKPILING GRAVEL	cubic metre	07
3965	STOCKPILING, MULCH PAVING MATERIAL	tonne	27
3971	STANDBY: (SUMMER)	---------	--
3972	EQUIPMENT MAINTENANCE: (SUMMER)	---------	--
3973	TRAVELLING TIME: (SUMMER)	---------	--
3980	MEETINGS	---------	--
3999	EXPENSES: SUMMER MAINTENANCE	---------	--
4017	EQUIPMENT REPAIRS - DELIVERY	---------	--
4023	EQUIPMENT REPAIRS - NON-GARAGE STAFF	---------	--

OPERATIONS GUIDE

OPERATION CODE	OPERATION DESCRIPTION	ACCOMPLISHMENT UNIT	CODE
	EQUIPMENT MAINTENANCE		
4016	GARAGE OVERHEAD:	---------	--
4050	PRIVATIZED WORK: TRADESMAN	---------	--
4051	REPAIRS TO DIST. EQUIP. IN DIST. GARAGE: MECHANICS	---------	--
4052	REPAIRS TO DIST. EQUIP. IN DIST. GARAGE: WELDERS	---------	--
4053	REPAIRS TO DIST. EQUIP. IN DIST. GARAGE: BODY MECH.	---------	--
4054	REPAIRS TO DIST. EQUIP. IN DIST. GARAGE: SPRAY PAINT	---------	--
4055	REPAIRS TO DIST. EQUIP. IN DIST. GARAGE: MACHINISTS	---------	--
4056	REPAIRS TO DIST. EQUIP. IN DIST. NON-TRADESMAN	---------	--
4057	ROAD SERVICE REPAIRS: MECHANICS	---------	--
4058	REPAIRS TO OTHER EQUIPMENT, AND MISCELLANEOUS WORK: MECHANICS	---------	--
4059	REPAIRS TO OTHER EQUIPMENT, AND MISCELLANEOUS WORK: NON-MECHANICS	---------	--
4060	TRAVELLING TIME	---------	--
4061	SUNDRY WORK AND HOUSEKEEPING: TRADESMEN	---------	--
4072	SUNDRY WORK AND HOUSEKEEPING: NON-TRADESMEN	---------	--
4063	STANDBY TIME: TRADESMEN	---------	--
4064	MEETINGS ETC.	---------	--
4065	SUPERVISION AND CLERICAL: NON-PRIVATIZED WORK	---------	--
4066	SUPERVISION AND CLERICAL: PRIVATIZED WORK	---------	--